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(54) Method and apparatus for selecting signal lines for their connection to a plurality of audio-visual devices

Vorrichtung und Verfahren zur Auswahl von Signalleitungen zur Verbindung mit einer Mehrzahl von Audio-Videoegeräten

Procédé et dispositif pour sélectionner des lignes de signaux afin de les connecter à une pluralité d'appareils audio-visuels

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- PATENT ABSTRACTS OF JAPAN vol. 13, no. 203  
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## Description

[0001] The present invention relates to a method of controlling signal lines between a plurality of audio and/or video units.

[0002] Although audio and video apparatus inclusive of a video tape recorder, a laser disc player and so forth are usable individually as complete products, it is typical practice to constitute an audio/video system by combining these units with another apparatus equipped with a display function, such as a television receiver or monitor.

[0003] Fig. 4 shows an exemplary audio/video system that consists of such combined units including a television receiver 1, a first video tape recorder 2, a second video tape recorder 3 and a laser disc player 4. The television receiver 1 serves also as a control unit for concentrating the control of the entire audio/video system and has a selector (not shown) and so forth therein for selectively switching the various signals. There are some other cases where the selector is provided independently of the television receiver 1 and where the independent selector functions as a central unit in the system.

[0004] The audio/video units 1 through 4 are mutually connected via video and audio signal cables as indicated by solid lines in Fig. 4, and a common control bus 9 is provided as indicated by a broken line for connecting the individual units 1 through 4. Specific identification numbers constituting intra-system addresses are preset for the various audio/video units, and both identification numbers and operation contents are designated via the control bus 9. Hereinafter audio and video signals will be referred to as AV signals.

[0005] In such audio/video system where every AV signal is accessed through the TV receiver 1, the following control methods are advantageously used for accessing the signals.

1. When any unit of the audio/video units 2 through 4, except the central units 1, needs connection of its signal line to some other audio/video unit, a request for connection of the signal line is sent to the central unit 1 and, simultaneously, the identification number for designating the other unit to be connected is output via the control bus 9 thereby specifying the other unit.

2. The request for connection in 1. above is executed with respect to each of the audio signal, and the video signal individually.

3. In the case of realizing a dubbing function or the like, first the signal line is connected and then a request for recording is sent to the VTR 2 or VTR 3.

[0006] By the procedure mentioned above, the AV signal can be accessed as desired among the audio/video units 1 through 4, and the central unit 1 is capable of concisely controlling or managing the audio/video units 2 through 4.

[0007] In the above audio/video system consisting of four units 1 through 4, when the signal line is to be connected between one audio/video unit and another audio/video unit, there exists the necessity of checking the identification number of the other audio/video unit. Furthermore, in the case where the other audio/video unit is one of the two VTRs 2 or 3 installed as in the example of Fig. 4, it is necessary to check which of the signal lines is to be connected for the VTR 2 or 3. Consequently a program is required for checking the identification number of the other audio/video unit and also for selecting the connection of the desired signal line. Furthermore, random access memory areas are required for storing the results of such identification checks.

[0008] In addition, when it is desired to connect both video and audio signals, there arises the necessity of sending two requests individually for the respective connections. Therefore, when accessing command signals for such requests, in an exemplary case where the access to one command signal requires 150 msec and the time interval between one command signal and the next one is 50 msec, it follows that the control bus 9 is used for a total period of 350 msec, and the remaining audio/video units are not connectable via the bus 9 during such period of time.

[0009] In the case of dubbing, for example, a request for connection of the signal line and a request for recording by the VTR need to be executed individually. Therefore, in this case also, the control bus 9 is rendered unusable with regard to the remaining audio/video units for a time period of 350 msec.

[0010] Furthermore, upon occurrence of any change in the state of any of the audio/video units apparatus 1 through 4, it becomes necessary to make a decision as to whether the connections of the entire signal lines in the audio/video system must be switched or the current connections are permissible, and selective switching is preferred, a request for changing the connection of the signal line needs to be sent to the central apparatus 1.

[0011] EP-A-0 487 952 discloses an audio visual system with a bus for automobiles. Different units are allotted different physical addresses and different functions within each unit are allotted logical addresses.

[0012] P.A.J. V13 No. 203 (P-870) relating to JP-A-1 021 755 describes an audio visual system including a bus that can automatically play a CD and a VD consecutively.

[0013] It is an aim of the present invention to alleviate the above problems observed in the related art by providing an improved method that simply controls connection of signal lines with facility among a plurality of audio and/or video units constituting an audio/video system.

[0014] According to one aspect of the present invention, there is provided a method of controlling signal lines between a plurality of audio video units connected in a system, wherein a central unit for control and the audio and video units are mutually connected via a single control bus and via audio and video and signal ca-

bles; the central unit having a selector for selectively switching a video signal or an audio signal accessed by one of the audio and video units, the method comprising steps of:

enabling the central unit to store identification numbers of the audio and video units on the control bus and connection data of the audio and video units; characterised by the further steps of:

classifying the plurality of audio and video units in accordance with their respective operational categories;

upon connecting a signal line between one of said audio and video units and another of said audio and video units, enabling the one audio or video unit to designate by the designated category the other audio and video unit to be connected; and

following such designation, enabling the central unit to select a specific one of the plurality of audio and video units that satisfies a connection requirement out of all of the entire audio and video units in the designated category and then switching the selector of at least the central unit to thereby connect the desired signal line to the selected one of the audio and video units.

[0015] According to another aspect of the present invention, there is provided apparatus for controlling signal lines between a plurality of audio and/or video units in a system, wherein a central apparatus is connected to said audio and/or video apparatus via a single control bus and also via video and/or audio signal cables, and includes a selector for selectively switching a video signal or an audio signal accessed by said audio and/or video apparatus, said central apparatus being for storing respective identification numbers of said audio and/or video apparatus on the control bus and also connection data of said audio and/or video apparatus; characterised in that:

said plurality of audio and/or video apparatus are classified in accordance with respective operational categories and when a signal line is to be connected between one of said audio and/or video apparatus and a desired one of said plurality of audio and/or video apparatus, said one audio and/or video apparatus designates the desired audio and/or video apparatus by the category thereof, and after such designation, said central apparatus selects the specific audio and/or video apparatus out of all of the audio and/or video apparatus of the designated category and then switches the selector of at least said central apparatus to thereby connect the desired signal line between the relevant audio and/or video apparatus.

[0016] Optionally according to the invention, connection of the video signal line and of the audio signal line are executed simultaneously by a single control signal. Each of the audio/video units voluntarily reports a change of the state thereof to the central unit via the control bus, and then the central unit controls the switching action of the selector in response to the report.

[0017] The present invention, further provides an audio/video system consisting of a plurality of audio/video units controlled by a signal-line controlling central unit that is connected to the audio/video units via a single control bus and also via video and/or audio signal cables and has a selector for selectively switching a video signal or an audio signal accessed by the audio/video units, and which includes apparatus as described above.

[0018] When connection of the signal line is required from one audio/video units, except the central apparatus, there is no necessity of checking the identification number of the other audio/video units to be connected. Moreover, even if a plurality of audio/video units are existent to be connected in the system, no process is needed for selection either. Therefore, the program needed in the related art for specifying the identification number is no longer necessary, consequently decreasing the required capacity of the read only memory and curtailing the production cost of the controlling microcomputer. Furthermore, the random access memory area for storing the result of the check is not needed either to eventually reduce the production cost in view of this point as well.

[0019] In the case of connecting both video and audio signals, there exists no necessity of sending two requests individually for the connection, and a single request is sufficient to achieve the desired connection to thereby shorten the time of using the control bus. Accordingly, the response time from the user's manipulation of the audio/video units to the execution of the command is minimized to consequently enhance the operational convenience.

[0020] Also in the case of executing a dubbing function; for example, it is not necessary for the source to send individual requests for connection of the signal line and for recording by the video tape recorder, and a single request is sufficient to meet the requirement, hence shortening the time of using the control bus. Thus, similarly to the above situation, the response time from the user's manipulation of the audio/video units to the execution of the command is also shortened to eventually enhance the operational convenience and facility.

[0021] In the conventional method, upon occurrence of a change in the state of any audio/video unit other than the central unit, it is necessary to make a decision as to whether the connection of all of the signal lines in the whole system must be switched or the current connection is permissible. When selective switching is preferred, a request for changing the signal line connection needs to be sent to the central unit, however, according to the present invention, such management is no longer

necessary to eventually minimize the required capacity of the read only memory for the program of the computer, hence realizing further curtailment of the production costs.

[0022] In addition, the central unit is capable of judging the states of the whole audio/video system and connecting the signal lines properly. Therefore a variety of functions can be realized with facility, inclusive of determining the priority order of the individual audio/video units, or executing none of switching action in case any audio/video unit placed previously in a playback mode is continuously maintained in the same operation mode. Thus, high flexibility is attainable in controlling the entire system.

[0023] The above and other features and advantages of the present invention will become apparent from the following description of exemplary embodiments which will be given with reference to the illustrative accompanying drawings, in which:

- Fig. 1 is a block diagram of a preferred embodiment for carrying out the method of the present invention;
- Fig. 2 is a schematic diagram showing an exemplary signal format;
- Fig. 3 is a schematic diagram showing another exemplary signal format; and
- Fig. 4 is a block diagram of a conventional system known in the related art.

[0024] In Fig. 1, audio/video units 1 through 4 are classified by a predetermined code in accordance with the operational categories of products and is given a specific identification number. For example: the TV Receiver is "20H", the Video tape recorder is "21H", and the Laser disc player is "22H".

[0025] An output terminal O and an input terminal I of the VTR 2 are connected respectively to an input terminal and an output terminal O of the TV receiver 1, and an output terminal O and an input terminal I of the VTR 3 are connected respectively to an input terminal and an output terminal of the TV receiver 1. Meanwhile output terminals O of the laser disc player LDP 4 are connected respectively to an input terminal I of the VTR 3 and an input terminal I of the TV receiver 1. A control bus 9 is connected among such audio/video units apparatus 1 through 4.

[0026] A control signal SCTL having a format shown Fig. 2A is accessed via the bus 9 among the audio/video units 1 through 4. More specifically, the control signal SCTL sequentially comprises, from the beginning as shown in Fig. 2A, a start bit SBIT indicating the start of the signal SCTL, mode data MDDT, source data SS indicating the identification number of the source audio/video unit from which the signal SCTL originates, destination data DD indicating the identification number of the destination audio/video unit where the signal SCTL terminates, control field data CFLD, main data MD, subsequent thereto, and an end bit END B.

[0027] In this example, the main data MD includes data 10, 20 and 30 having the formats shown in Figs. 2B, 2C, and 2D, respectively. The first main data 10 is used as a request for connection from any of the audio/video units 2 through 4 to the central unit 1 and also for batch control of the connection of the video and audio signal lines.

[0028] For this purpose, the data 10 sequentially comprises, from the beginning as shown in Fig. 2B, data 11 signifying that the data 10 is a request command for connection of the signal line, data 12 indicating the category of the desired destination audio/video unit to be connected, data 13 indicating the definition of the video signal, data 14 of the terminal number for access to the video signal, data 15 indicating the definition of the audio signal, and data 16 of the terminal number for access to the audio signal.

[0029] The data 13 signifies whether the video signal to be accessed is a normal video signal, a high-definition analog video signal, or a digital video signal. The terminal numbers represented by the data 14 and 16 indicate either the output terminal or the input terminal of the source audio/video unit 2 through 4 having outputted the main data 10 therefrom. If the data 14 and 16 are set to mutually equal numbers, the video and audio signal lines can be connected interlockingly with each other. These data may be set to mutually different numbers as well.

[0030] When the data 14 through 16 are hexadecimal "FF", such data signify maintenance of the preceding state, and it is also possible to change merely the connection of the video signal line or that of the audio signal line. The data 15 signifies whether the audio signal to be accessed is a normal audio signal, a high-definition analog audio signal, or a digital audio signal.

[0031] The second main data 20 serves as a request for recording to the VTR while serving to designate the signal to be recorded. The data 20 sequentially comprises, from the beginning as shown in Fig. 2C, data 21 indicating execution of a recording operation, data 22 indicating the direction of the signal, data 23 indicating the definition of the video signal, data 24 indicating the terminal number for access to the video signal, data 25 indicating the definition of the audio signal, and data 26 indicating the terminal number for access to the audio signal. The terminal numbers represented by the data 24 and 26 indicate the output terminal or the input terminal of the audio/video units 1 through 4 having outputted the main data 20 therefrom.

[0032] The third main data 30 is outputted voluntarily from the audio/video unit for selectively switching the internal connection of the video or audio signal line by that audio/video unit. The main data 30 sequentially comprises, from the beginning as shown in Fig. 2D, data 31 signifying that the main data 30 is a report of the operating state, data 32 indicating the category, data 33 indicating the operating state, data 34 for supplementing the details of the operating state, and data 35 indicating

a transition to the desired operating state or completion of such transition. Nevertheless, the category data 32 included in the main data 30 denotes that the operating state indicated by the data 33 relates to a power supply circuit, a tuner, or a tape deck mechanism of the specific audio/video unit having outputted the main data 30.

[0033] In the embodiment described above, when the AV signal reproduced by the LDP 4 is to be dubbed in the VTR, the control signal SCTL including the main data shown in Fig. 3A is outputted from the LDP 4 via the bus 9 in accordance with the format of Fig. 2B. In this case, the data SS indicating the identification number of the source audio/video unit relative to the control signal SCTL designates the LDP 4, and the data DD indicating the identification number of the destination audio/video unit relative to the control signal SCTL designates the central unit 1.

[0034] The main data MD included in the control signal SCTL corresponds to the data 10 in this case, and the data 11 signifies a request for connection. The data 12 signifies the category of the VTR, and the data 13 indicates the definition of the video signal outputted from the LDP 4, for example, the data signifying a normal video signal. Since the video signal is delivered from the output terminal of the LDP 4, the data 14 indicates the output terminal thereof. Further the data 15 indicates the definition of the audio signal outputted from the LDP 4, for example, the data signifying a normal audio signal. Since the audio signal is delivered from the output terminal of the LDP 4, the data 16 indicates the output terminal.

[0035] The control signal SCTL outputted from the LDP 4 via the bus 9 is supplied to the audio/video units 1 through 3. This control signal SCTL is rendered effective in the central unit 1 on the basis of the data SS and DD included in the signal SCTL, and the central unit 1 detects that the source audio/video unit relative to the control signal SCTL is the LDP 4.

[0036] As the main data MD included in the control signal SCTL is the data 10 in this case, the central unit 1 detects from the data 11 that the request is for connection and also detects from the data 12 that the desired connection is to the VTR. Since the central unit 1 knows the entire constitution of the system, it selects the VTR 2 or 3 suited for recording. Supposing now that the VTR 2 is selected, the central unit 1 connects the input terminal thereof to the output terminal to which the selected VTR 2 is connected, thereby ensuring the AV signal line from the LDP 4 to the VTR 2.

[0037] When the central unit 1 executes a dubbing operation between the LDP 4 and the VTR 2, for example, the control signal SCTL including the main data 20 shown in Fig. 3B is outputted from the central unit 1 via the bus 9 in accordance with the format of Fig. 2C. In this case, the data SS indicating the identification number of the source unit of the control signal SCTL designates the central unit 1, and the data DD indicating the identification number of the destination audio/video

unit relative to the control signal SCTL designates the VTR 2.

[0038] The main data MD included in the control signal SCTL corresponds to the data 20 in this example. The data 21 signifies execution of a recording operation, and the data 22 signifies that the signal is directed from the central apparatus 1 to the VTR 2. The data 23 indicates the definition of the video signal outputted from the central unit 1. Since the video signal is supplied to the input terminal of the VTR 2, the data 24 indicates the input terminal. Further the data 25 indicates the definition of the audio signal outputted from the central unit 1. Since the audio signal is supplied to the input terminal of the VTR 2, the data 26 indicates the input terminal.

[0039] Such control signal SCTL outputted from the central unit 1 via the bus 9 is supplied to the audio/video units 2 through 4. The control signal SCTL is rendered effective merely in the VTR 2 on the basis of the data SS and DD included in the signal SCTL, so that the VTR 2 starts a recording operation in accordance with the data 20 of the control signal SCTL. Thus, dubbing from the LDP 4 to the VTR 2 is performed.

[0040] When the VTR 2 operates in a playback mode, the control signal SCTL including the main data 30 of Fig. 3C is outputted from the VTR 2 via the bus 9 upon the start of the playback operation. In this case, the data SS indicating the identification number of the source audio/video unit relative to the control signal SCTL designates the VTR 2, and the data indicating the identification number of the destination audio/video unit relative to the signal SCTL designates the central unit 1.

[0041] The main data MD included in the control signal SCTL corresponds to the data 30 in this example. The data 31 in the main data 30 represents a report on the operating state of the VTR 2, and the data 32 represents a report on the operating state of the tape deck mechanism in the VTR 2. The data 33 signifies that the state of the mechanism represented by the data 32 is a playback mode, and the data 34 signifies that the playback mode is executed in the forward direction at a regular speed. The data 35 signifies completion of a transition to the playback mode.

[0042] When the control signal SCTL outputted from the VTR 2 via the bus 9 is supplied to the audio/video units 2 through 4, the control signal SCTL is rendered effective merely in the central unit 1 on the basis of the data SS and DD included in the signal SCTL. And thus the state of the VTR 2 is reported to the central unit 1.

[0043] Then the central unit 1 inspects the entire current status of the whole system and, if the result of such inspection is proper, the central unit 1 connects the input terminal thereof to appropriate video and audio circuits, not shown, whereby the picture and the sound reproduced by the VTR 2 are outputted from the TV receiver 1.

[0044] Suppose now that the report from the VTR 2 is received when the LDP 4 is in the playback mode, for example, and the reproduced picture and sound are be-

ing outputted from the TV receiver 1. In such a case, the connection to the LDP 4 can be maintained continuously, or a switching action can be executed to deliver the reproduced picture and sound obtained from the VTR 2. Such selection is presettable by the user or may be performed by the user each time on an interrupt basis.

[0045] As described above, when connection of the signal line is required from one source audio/video unit, except the central unit 1, there is no necessity of checking the identification number of the other destination apparatus to be connected. Even if a plurality of audio/video units exist in the system, no process is needed for selection either. Therefore, the program needed in the related art for specifying the identification number is no longer necessary consequently decreasing the required capacity of the read only memory and curtailing the production cost of the controlling microcomputer. Furthermore, the random access memory area for storing the result of the check is not needed either to eventually reduce the production cost in view of this point as well.

[0046] In the case of connecting both video and audio signals, there exists no necessity of sending two requests individually for the connection, and a single request is sufficient to achieve the desired connection to thereby shorten the time of using the control bus 9. Accordingly, the response time from the user's manipulation of the audio/video units 2 through 4 to the execution of the request command is minimized to consequently enhance the operational convenience.

[0047] Also in the case of executing a dubbing function, for example, it is not necessary for the source (e. g. LDP4) to send individual requests for connection of the signal line and for recording by the VTR. A single request is sufficient to meet the requirement, hence, shortening the time of using the control bus 9. Thus, similarly to the above, the response time from the user's manipulation of the audio/video units 2 through 4 to the execution of the command is also shortened to eventually enhance the operational convenience and facility.

[0048] In the conventional method, upon occurrence of a change in the state of any audio/video units apparatus 2 through 4 other than the central unit 1, it is necessary to make a decision as to whether the connection of the entire signal lines in the whole AV system must be switched or the current connection is permissible. When selective switching is preferred, a request for changing the signal line connection needs to be sent to the central apparatus 1. According to the present invention, however, such management is no longer necessary to eventually minimize the required capacity of the ROM for the program of the computer, hence realizing further curtailment of the production cost.

[0049] In addition, the central unit 1 is capable of judging the states of the whole AV system and connecting the signal lines properly. Therefore, a variety of functions can be realized with facility, inclusive of determining the priority order of the individual audio/video units, or executing none of switching action in case any audio/

video unit placed earlier in a playback mode is continuously maintained in the same operation mode. Thus, high flexibility is attainable in controlling the entire system.

## Claims

1. A method of controlling signal lines between a plurality of audio video units (1-4) connected in a system, wherein a central unit (1) for control and the audio and video units (1-4) are mutually connected via a single control bus (9) and via audio and video and signal cables, the central unit having a selector for selectively switching a video signal or an audio signal accessed by one of the audio and video units, the method comprising steps of:

enabling the central unit (1) to store identification numbers of the audio and video units on the control bus and connection data of the audio and video units (1-4); characterised by the further steps of:

classifying the plurality of audio and video units (1-4) in accordance with their respective operational categories;

upon connecting a signal line between one of said audio and video units (1-4) and another of said audio and video units (1-4), enabling the one audio or video unit to designate by the designated category the other audio and video unit to be connected; and

following such designation, enabling the central unit (1) to select a specific one of the plurality of audio and video units that satisfies a connection requirement out of all of the entire audio and video units in the designated category and then switching the selector of at least the central unit to thereby connect the desired signal line to the selected one of the audio and video units.

2. A method according to claim 1, wherein connection of the video signal line and connection of the audio signal line are executed simultaneously by a single control signal.

3. A method according to claim 1 or 2, wherein said another of said audio and video units to be connected is a recorder (2,3), and a source unit of the plurality of audio and video units that outputs the signal to be recorded is designated simultaneously by sending a recording request to the recorder.

4. A method according to claim 1, 2 or 3, wherein each of the plurality of audio and video units (1-4) performs voluntary reporting of a change of state thereof to the central unit (1) via the control bus (9), and

then the central unit (1) controls the switching action of the selector in response to the reporting.

5. A method according to claim 4, wherein the plurality of audio and video units include a tape recorder (2,3) and a disc player (4) and said central unit (1) controls the switching action of the selector in response to the reporting and enables said tape recorder to dub the reproduced signal obtained from said disc player.
6. A method according to claim 4, wherein said plurality of audio and video units include first and second tape recorder/players (2,3), and said central unit controls the switching action of the selector in response to the reporting and enables said second tape recorder/player to dub the reproduced signal obtained from said first tape recorder/player.
7. A method according to claim 4, wherein the plurality of audio and video units includes a tape player (2,3) or a disc player (1) that reproduces a signal to be displayed on a television receiver (1), and said central unit (1) controls the switching action of the selector in response to the reporting and displays the reproduced signal on said television receiver (1).
8. A method according to claim 4, wherein the said plurality of audio and video units includes a tape player (2,3) or a disc player (4) that reproduces a signal to be displayed on a television receiver (1), and said central unit controls power supply circuits for said audio and video units in response to the reporting.
9. Apparatus for controlling signal lines between a plurality of audio and/or video units (1-4) in a system, wherein a central apparatus (1) is connected to said audio and/or video apparatus via a single control bus (9) and also via video and/or audio signal cables and includes a selector for selectively switching a video signal or an audio signal accessed by said audio and/or video apparatus, said central apparatus (1) being for storing respective identification numbers of said audio and/or video apparatus on the control bus and also connection data of said audio and/or video apparatus; characterised in that:
 

said plurality of audio and/or video apparatus (1-4) are classified in accordance with respective operational categories and when a signal line is to be connected between one of said audio and/or video apparatus and a desired one of said plurality of audio and/or video apparatus, said one audio and/or video apparatus designates the desired audio and/or video apparatus by the category thereof, and after such designation, said central apparatus (1) selects the specific audio and/or video apparatus, out of all of the audio and/or video apparatus (1-4) of the designated category and then switches the

selector of at least said central apparatus to thereby connect the desired signal line between the relevant audio and/or video apparatus.

10. Apparatus according to claim 9, wherein connection of the video signal line and connection of the audio signal line are executed simultaneously by a single control signal.
11. Apparatus according to claim 9 or 10, wherein said desired audio and/or video apparatus to be connected is a recorder (2,3), and a source audio and/or video apparatus (2-4) that outputs a signal to be recorded is designated simultaneously with a recording request sent to said recorder.
12. Apparatus according to claim 9, 10 or 11, wherein each of said plurality of audio and/or video apparatus (1-4) voluntarily reports a change of the state thereof to said central apparatus (1) via the control bus (9), and then said central apparatus controls the switching action of the selector in response to said report.
13. Apparatus according to claim 12, wherein said plurality of audio and/or video apparatus include a tape recorder (2,3) and a disc player (4) and said central apparatus controls the switching action of the selector in response to said report and enables said tape recorder (2,3) to dub the reproduced signal obtained from said disc player (4).
14. Apparatus according to claim 12, wherein said plurality of audio and/or video apparatus include first and second tape recorders and/or players (2,3), and said central apparatus (1) controls the switching action of the selector in response to said report and enables said second tape recorder and/or player to dub the reproduced signal obtained from said first tape recorder and/or player.
15. Apparatus according to claim 12, wherein said plurality of audio and/or video apparatus includes a tape player or a disc player (2-4) that reproduces a signal to be displayed on a television receiver (1), and said central apparatus (1) controls switching action of the selector in response to said report and displays the reproduced signal on a television receiver (1).
16. Apparatus according to claim 12, wherein said plurality of audio and/or video apparatus includes a tape player or a disc player (2-4) that reproduces a signal to be displayed on a television receiver (1), and said central apparatus controls power supply circuits for said audio and/or video apparatus in response to said report.

17. A system consisting of a plurality of audio and/or video units controlled by a signal-line controlling central unit connected to said plurality of audio and/or video apparatus via a single control bus and via video and/or audio signal cables and including a selector for selectively switching a video signal or an audio signal accessed by one of said plurality of audio and/or video apparatus; said system including apparatus according to any one of claims 9 to 16.

#### Patentansprüche

1. Verfahren zum Steuern von Signalleitungen zwischen einer Mehrzahl von Audio- und Videoeinheiten (1-4); die in einem System miteinander verbunden sind, wobei eine Zentraleinheit (1) zur Steuerung und die Audio- und Videoeinheiten (1-4) über einen einzigen Steuerbus (9) und über Audio- und Videosignalkabel miteinander verbunden sind und die Zentraleinheit einen Wähler zum selektiven Schalten eines Videosignals oder eines Audiosignals aufweist, auf das von einer der Audio- und Videoeinheiten zugegriffen wird, wobei das Verfahren den Verfahrensschritt umfaßt:

Aktivieren der Zentraleinheit (1), so daß sie Identifizierungsnummern der Audio- und Videoeinheiten auf dem Steuerbus und Verbindungsdaten der Audio- und Videoeinheiten (1-4) speichert,

gekennzeichnet durch die weiteren Verfahrensschritte:

- Klassifizieren der Mehrzahl von Audio- und Videoeinheiten (1-4) nach ihren jeweiligen Funktionskategorien;
- beim Schalten einer Signalleitung zwischen einer der Audio- und Videoeinheiten (1-4) und einer anderen der Audio- und Videoeinheiten (1-4) Aktivieren der einen Audio- oder Videoeinheit, so daß sie die zu verbindende andere Audio- und Videoeinheit durch die festgelegte Kategorie festlegt, und
- im Anschluß an dieses Festlegen Aktivieren der Zentraleinheit (1), so daß sie von allen Audio- und Videoeinheiten der festgelegten Kategorie ein spezifisches Exemplar aus der Mehrzahl von Audio- und Videoeinheiten auswählt, das die Bedingung für eine Verbindung erfüllt, und Umschalten des Wählers zumindest der Zentraleinheit und dadurch Verbinden der gewünschten Signalleitung mit dem ausgewählten Exemplar der Audio- und Videoeinheiten.

2. Verfahren nach Anspruch 1, bei dem das Verbinden der Videosignalleitung und das Verbinden der Au-

diosignalleitung gleichzeitig durch ein einziges Steuersignal erfolgen.

3. Verfahren nach Anspruch 1 oder 2, bei dem die andere der zu verbindenden Audio- und Videoeinheiten ein Aufzeichnungsgerät (2, 3) ist und gleichzeitig durch Aussenden einer Aufzeichnungsanforderung an das Aufzeichnungsgerät eine Quelleinheit aus der Mehrzahl von Audio- und Videoeinheiten festgelegt wird, die das aufzuzeichnende Signal ausgibt.

4. Verfahren nach Anspruch 1, 2 oder 3, bei dem jede aus der Mehrzahl von Audio- und Videoeinheiten (1-4) von sich aus eine Meldung über eine Änderung ihres Zustands über den Steuerbus (9) an die Zentraleinheit (1) liefert und die Zentraleinheit (1) dann das Umschalten des Wählers in Abhängigkeit von dieser Meldung steuert.

5. Verfahren nach Anspruch 4, bei dem die Mehrzahl von Audio- und Videoeinheiten ein Bandaufzeichnungsgerät (2,3) und einen Disk-Player (4) umfaßt und die Zentraleinheit (1) das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das Bandaufzeichnungsgerät aktiviert, so daß dieses das von dem Disk-Player abgegebene Wiedergabesignal überspielt.

6. Verfahren nach Anspruch 4, bei dem die Mehrzahl von Audio- und Videoeinheiten ein erstes und ein zweites Bandaufzeichnungs-/wiedergabegerät (2, 3) umfaßt und die Zentraleinheit (1) das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das zweite Bandaufzeichnungs-/wiedergabegerät aktiviert, so daß dieses das von dem ersten Bandaufzeichnungs-/wiedergabegerät abgegebene Wiedergabesignal überspielt.

7. Verfahren nach Anspruch 4, bei dem die Mehrzahl von Audio- und Videoeinheiten ein Bandwiedergabegerät (2, 3) oder einen Disk-Player (4) umfaßt, der ein auf einem Fernsehempfänger (1) anzuzeigendes Signal wiedergibt und bei dem die Zentraleinheit (1) das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das Wiedergabesignal auf dem Fernsehempfänger (1) anzeigt.

8. Verfahren nach Anspruch 4, bei dem die Mehrzahl von Audio- und Videoeinheiten ein Bandwiedergabegerät (2,3) oder einen Disk-Player (4) umfaßt, das bzw. der ein auf einem Fernsehempfänger (1) anzuzeigendes Signal wiedergibt und bei dem die Zentraleinheit (1) die Stromversorgungsschaltungen für die Audio- und Videoeinheiten in Abhängigkeit von der Meldung steuert.

9. Vorrichtung zur Steuerung von Signalleitungen zwi-



schen einer Mehrzahl von Audio- und Videoeinheiten (1-4) in einem System, wobei ein Zentralgerät (1) über einen einzigen Steuerbus (9) und über Video- und/oder Audiosignalkabel mit dem Audio- und/oder Videogerät verbunden ist und einen Wähler aufweist für das selektive Schalten eines Videosignals oder eines Audiosignals, auf das von dem genannten Audio- und/oder Videogerät zugegriffen wird, wobei das Zentralgerät (1) entsprechende Identifizierungsnummern der Audio- und/oder Videogeräte auf dem Steuerbus und Verbindungsdaten des Audio- und/oder Videogeräts speichern kann,

dadurch gekennzeichnet,

daß die Mehrzahl von Audio- und/oder Videogeräten (1-4) nach entsprechenden Funktionskategorien klassifiziert sind und, wenn eine Signalleitung zwischen einem der Audio- und/oder Videogeräte und einem gewünschten Exemplar aus der Mehrzahl von Audio- und/oder Videogeräten zu schalten ist, dieses eine Audio- und/oder Videogerät, das gewünschte Audio- und/oder Videogerät durch seine Kategorie festlegt und nach einer solchen Festlegung das Zentralgerät (1) aus allen Audio- und/oder Videogeräten (1-4) der festgelegten Kategorie das spezifische Audio- und/oder Videogerät auswählt und dann zumindest den Wähler des Zentralgeräts umschaltet und dadurch, die gewünschte Signalleitung zwischen die relevanten Audio- und/oder Videogeräte schaltet.

10. Vorrichtung nach Anspruch 9, bei der das Verbinden der Videosignalleitung und das Verbinden der Audiosignalleitung gleichzeitig durch ein einziges Steuersignal erfolgen.

11. Vorrichtung nach Anspruch 9 oder 10, bei der das gewünschte Audio- und/oder Videogerät ein Aufzeichnungsgerät (2, 3) ist und durch Aussenden mit einer an das Aufzeichnungsgerät gesendeten Aufzeichnungsanforderung gleichzeitig ein Quellen-Audio- und/oder -Videogerät festgelegt wird, das ein aufzuzeichnendes Signal ausgibt.

12. Vorrichtung nach Anspruch 9, 10 oder 11, bei der jedes aus der Mehrzahl von Audio- und/oder Videogeräten (1-4) von sich aus eine Änderung seines Zustands über den Steuerbus (9) an die Zentraleinheit (1) meldet und das Zentralgerät dann das Umschalten des Wählers in Abhängigkeit von dieser Meldung steuert.

13. Vorrichtung nach Anspruch 12, bei der die Mehrzahl von Audio- und/oder Videogeräten ein Bandaufzeichnungsgerät (2,3) und einen Disk-Player (4) umfaßt und das Zentralgerät das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das Bandaufzeichnungsgerät (2, 3) aktiviert, so

daß dieses das von dem Disk-Player abgegebene Wiedergabesignal überspielt.

14. Vorrichtung nach Anspruch 12, bei der die Mehrzahl von Audio- und/oder Videogeräten ein erstes und ein zweites Bandaufzeichnungs- und/oder -wiedergabegerät (2,3) umfaßt und das Zentralgerät das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das zweite Bandaufzeichnungs- und/oder -wiedergabegerät aktiviert, so daß dieses das von dem ersten Bandaufzeichnungs- und/oder -wiedergabegerät abgegebene Wiedergabesignal überspielt.

15. Vorrichtung nach Anspruch 12, bei der die Mehrzahl von Audio- und/oder Videogeräten ein Bandwiedergabegerät oder einen Disk-Player (2-4) umfaßt, das bzw. der ein auf einem Fernsehempfänger (1) anzuzeigendes Signal wiedergibt, und bei dem das Zentralgerät (1) das Umschalten des Wählers in Abhängigkeit von der Meldung steuert und das Wiedergabesignal auf dem Fernsehempfänger (1) anzeigt.

16. Vorrichtung nach Anspruch 12, bei der die Mehrzahl von Audio- und/oder Videogeräten ein Bandwiedergabegerät oder einen Disk-Player (2, 4) umfaßt, das bzw. der ein auf einem Fernsehempfänger (1) anzuzeigendes Signal wiedergibt, und bei dem das Zentralgerät (1) die Stromversorgungsschaltungen für die Audio- und/oder Videogeräte in Abhängigkeit von der Meldung steuert.

17. System, bestehend aus einer Mehrzahl von Audio- und Videoeinheiten, die von einer Zentraleinheit zur Signalleitungssteuerung gesteuert werden, die mit der Mehrzahl von Audio- und/oder Videogeräten über einen einzigen Steuerbus und über Video- und/oder Audiosignalkabel verbunden ist, mit einem Wähler zum selektiven Schalten eines Videosignals oder eines Audiosignals, auf das von einem aus der Mehrzahl von Audio- und/oder Videogeräten zugegriffen wird, wobei das System eine Vorrichtung nach einem der Ansprüche 9 bis 16 aufweist.

## Revendications

1. Procédé de commande de lignes de signaux entre une pluralité d'unités audio et vidéo (1 à 4) reliées en un système, dans lequel une unité centrale (1) destinée à la commande et les unités audio et vidéo (1 à 4) sont mutuellement reliées par l'intermédiaire d'un seul bus de commande (9) et par l'intermédiaire de câbles de signaux audio et vidéo, l'unité centrale comportant un sélecteur destiné à commuter sélectivement un signal vidéo ou un signal audio auxquels accède l'une des unités audio et vidéo, le

procédé comprenant les étapes consistant à :

- permettre à l'unité centrale (1) de mémoriser des numéros d'identification des unités audio et vidéo sur le bus de commande et des données de connexion des unités audio et vidéo (1 à 4), caractérisé par les étapes supplémentaires consistant à :

classer la pluralité des unités audio et vidéo (1 à 4) conformément à leurs catégories fonctionnelles respectives,

lors de la connexion d'une ligne de signal entre l'une desdites unités audio et vidéo (1 à 4) et une autre desdites unités audio et vidéo (1 à 4), permettre à la première unité audio ou vidéo de désigner par la catégorie désignée l'autre unité audio et vidéo à relier, et

à la suite d'une telle désignation, permettre à l'unité centrale (1) de sélectionner une unité particulière parmi la pluralité d'unités audio et vidéo qui satisfait une exigence de connexion parmi l'ensemble de toutes les unités audio et vidéo dans la catégorie désignée et commuter ensuite le sélecteur d'au moins l'unité centrale afin de connecter ainsi la ligne de signal désirée à l'unité sélectionnée parmi les unités audio et vidéo.
2. Procédé selon la revendication 1, dans lequel la connexion de la ligne de signal vidéo et la connexion de la ligne de signal audio sont exécutées simultanément par un seul signal de commande.
3. Procédé selon la revendication 1 ou 2, dans lequel ladite autre unité parmi lesdites unités audio et vidéo à relier est un enregistreur (2,3) et une unité source parmi la pluralité des unités audio et vidéo qui fournit en sortie le signal à enregistrer est désignée simultanément en envoyant une demande d'enregistrement vers l'enregistreur.
4. Procédé selon la revendication 1, 2 ou 3, dans lequel chaque unité parmi la pluralité d'unités audio et vidéo (1 à 4) exécute un compte-rendu volontaire d'un changement d'état de celle-ci vers l'unité centrale (1) par l'intermédiaire du bus de commande (9), et ensuite l'unité centrale (1) commande l'action de commutation du sélecteur en réponse au compte-rendu.
5. Procédé selon la revendication 4, dans lequel la pluralité d'unités audio et vidéo comprend un enregistreur à bande (2, 3) et un lecteur de disque (4) et ladite unité centrale (1) commande l'action de commutation du sélecteur en réponse au compte-rendu et permet que ledit enregistreur de bande duplique le signal reproduit obtenu à partir dudit lecteur de disque.

6. Procédé selon la revendication 4, dans lequel ladite pluralité d'unités audio et vidéo comprend des premier et second enregistreurs/lecteurs de bande (2, 3), et ladite unité centrale commande l'action de commutation du sélecteur en réponse au compte-rendu et permet au second enregistreur/lecteur de bande de dupliquer le signal reproduit obtenu à partir dudit premier enregistreur/lecteur de bande.
  7. Procédé selon la revendication 4, dans lequel la pluralité des unités audio et vidéo comprend un lecteur de bande (2, 3) ou un lecteur de disque (1) qui reproduit un signal devant être affiché sur un récepteur de télévision (1), et ladite unité centrale (1) commande l'action de commutation du sélecteur en réponse au compte-rendu et affiche le signal reproduit sur ledit récepteur de télévision (1).
  8. Procédé selon la revendication 4, dans lequel ladite pluralité d'unités audio et vidéo comprend un lecteur de bande (2, 3) ou bien un lecteur de disque (4) qui reproduit un signal devant être affiché sur un récepteur de télévision (1), et ladite unité centrale commande des circuits d'alimentation pour lesdites unités audio et vidéo en réponse au compte-rendu.
  9. Appareil destiné à commander des lignes de signaux entre une pluralité d'unités audio et/ou vidéo (1 à 4) dans un système, dans lequel un appareil central (1) est relié auxdits appareils audio et/ou vidéo par l'intermédiaire d'un seul bus de commande (9) et également par l'intermédiaire de câbles de signaux vidéo et/ou audio et comprend un sélecteur destiné à la commutation sélective d'un signal vidéo ou d'un signal audio auquel accède lesdits appareils audio et/ou vidéo, ledit appareil central (1) étant destiné à mémoriser des numéros d'identification respectifs desdits appareils et/ou vidéo sur le bus de commande et également des données de connexion desdits appareils audio et/ou vidéo, caractérisé en ce que :
- ladite pluralité d'appareils audio et/ou vidéo (1 à 4) est classée conformément à des catégories fonctionnelles respectives et lorsqu'une ligne de signal doit être reliée entre l'un desdits appareils audio et/ou vidéo et un appareil désigné parmi ladite pluralité d'appareils audio et/ou vidéo, ledit premier appareil audio et/ou vidéo désigne l'appareil audio et/ou vidéo désiré par la catégorie de celui-ci, et après une telle désignation, ledit appareil central (1) sélectionne l'appareil audio et/ou vidéo particulier, parmi l'ensemble des appareils audio et/ou vidéo (1 à 4) de la catégorie désignée et commute alors le sélecteur d'au moins ledit appareil central afin de connecter ainsi la ligne de signal désirée entre les appareils audio et/ou vidéo con-

cernés.

10. Appareil selon la revendication 9, dans lequel la connexion de la ligne de signal vidéo et la connexion de la ligne de signal audio sont exécutées simultanément par un seul signal de commande.
11. Appareil selon la revendication 9 ou 10, dans lequel ledit appareil audio et/ou vidéo désiré devant être relié est un enregistreur (2, 3) et un appareil audio et/ou vidéo source (2 à 4) qui fournit en sortie un signal devant être enregistré est désigné simultanément à une demande d'enregistrement émise vers ledit enregistreur.
12. Appareil selon la revendication 9, 10 ou 11, dans lequel chaque appareil de la pluralité d'appareils audio et/ou vidéo (1 à 4) rend volontairement compte d'un changement d'état de celui-ci audit appareil central (1) par l'intermédiaire du bus de commande (9), et ensuite ledit appareil central commande l'action de commutation du sélecteur en réponse audit compte-rendu.
13. Appareil selon la revendication 12, dans lequel ladite pluralité d'appareils audio et/ou vidéo comprend un enregistreur à bande (2, 3) et un lecteur de disque (4) et ledit appareil central commande l'action de commutation du sélecteur en réponse audit compte-rendu et permet que ledit enregistreur à bande (2, 3) duplique le signal reproduit obtenu à partir dudit lecteur de disque (4).
14. Appareil selon la revendication 12, dans lequel ladite pluralité d'appareils audio et/ou vidéo comprend des premier et second enregistreurs et/ou lecteurs à bande (2, 3), et ledit appareil central (1) commande l'action de commutation du sélecteur en réponse audit compte-rendu et permet que ledit second enregistreur et/ou lecteur à bande duplique le signal reproduit obtenu à partir dudit premier enregistreur et/ou lecteur à bande.
15. Appareil selon la revendication 12, dans lequel ladite pluralité d'appareils audio et/ou vidéo comprend un lecteur de bande ou un lecteur de disque (2 à 4) qui reproduit un signal devant être affiché sur un récepteur de télévision (1), et ledit appareil central (1) commande l'action de commutation du sélecteur en réponse audit compte-rendu et affiche le signal reproduit sur un récepteur de télévision (1).
16. Appareil selon la revendication 12, dans lequel ladite pluralité d'appareils audio et/ou vidéo comprend un lecteur de bande ou un lecteur de disque (2 à 4) qui reproduit un signal devant être affiché sur un récepteur de télévision (1), et ledit appareil central commande les circuits d'alimentation des-

dits appareils audio et/ou vidéo en réponse audit compte-rendu.

17. Système constitué d'une pluralité d'unités audio et/ou vidéo commandées par une unité centrale de commande de ligne de signal reliée à ladite pluralité d'appareils audio et/ou vidéo par l'intermédiaire d'un seul bus de commande et par l'intermédiaire de câbles de signaux vidéo et/ou audio et comprenant un sélecteur destiné à la commutation sélective d'un signal vidéo ou d'un signal audio auxquels accède un appareil parmi ladite pluralité d'appareils audio et/ou vidéo; ledit système comprenant un appareil selon l'une quelconque des revendications 9 à 16.

FIG. 1

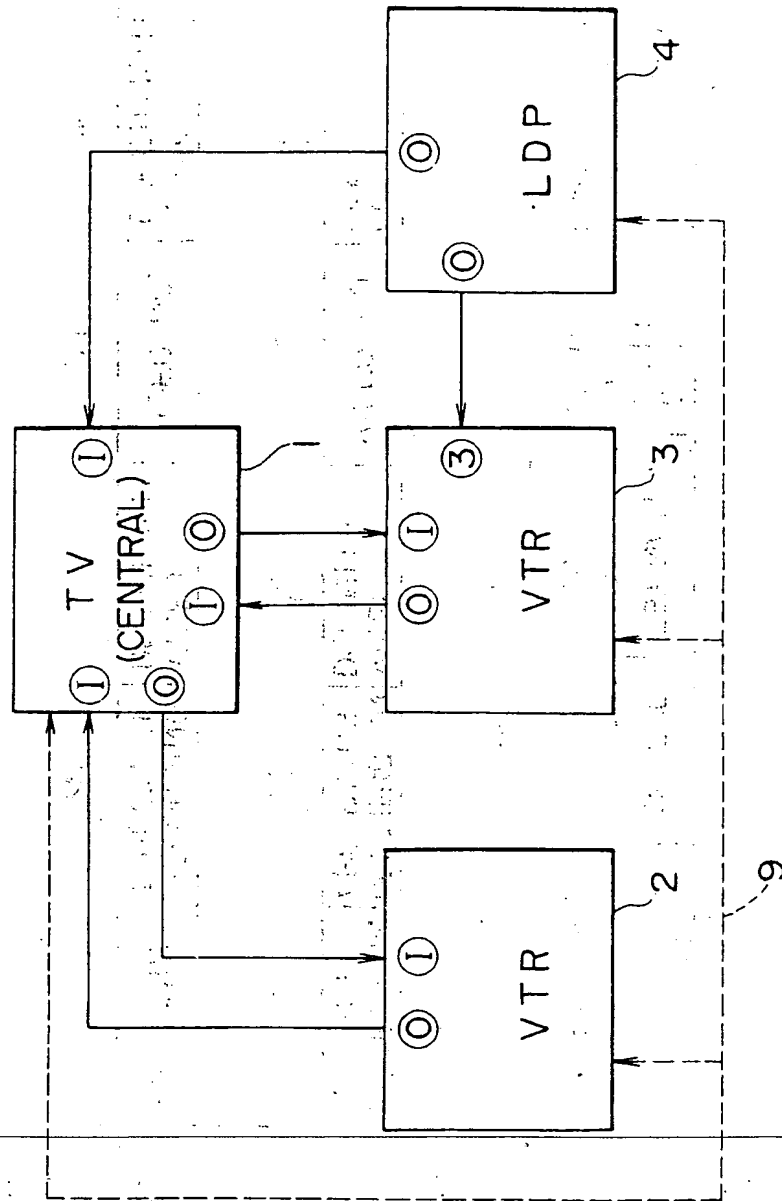


FIG. 2A

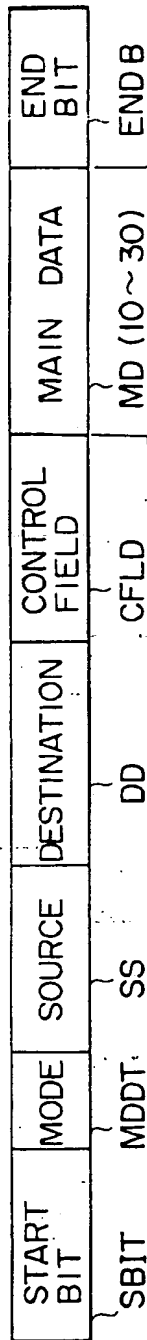


FIG. 2B

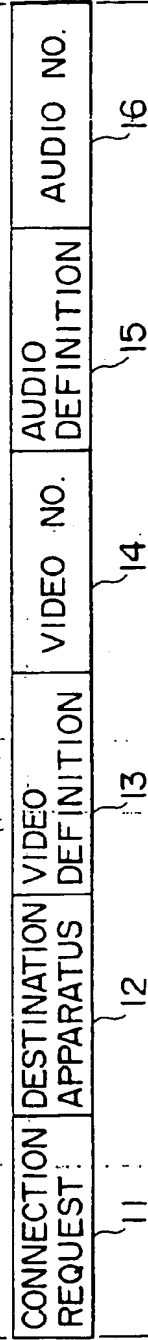


FIG. 2C

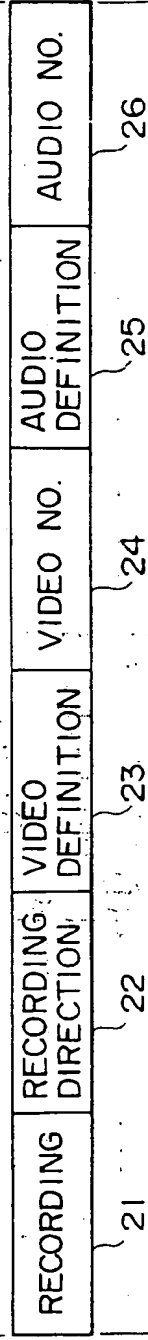


FIG. 2D

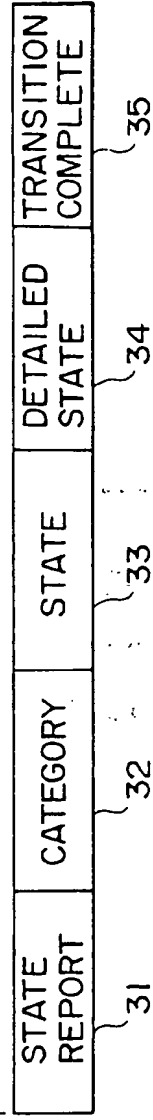


FIG. 3A

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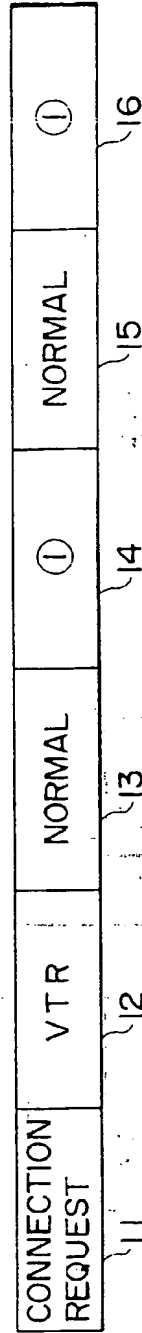


FIG. 3B

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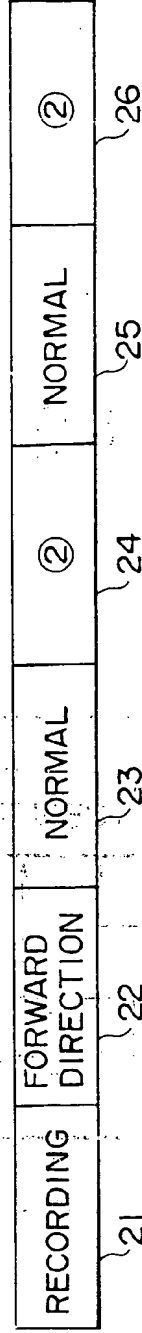


FIG. 3C

30

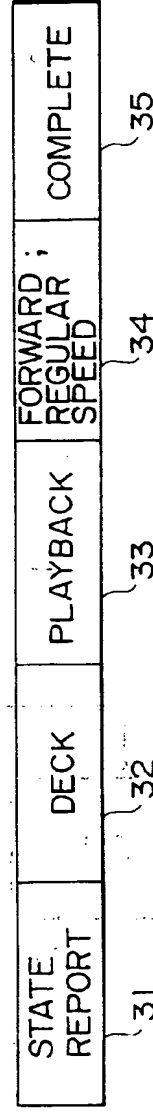
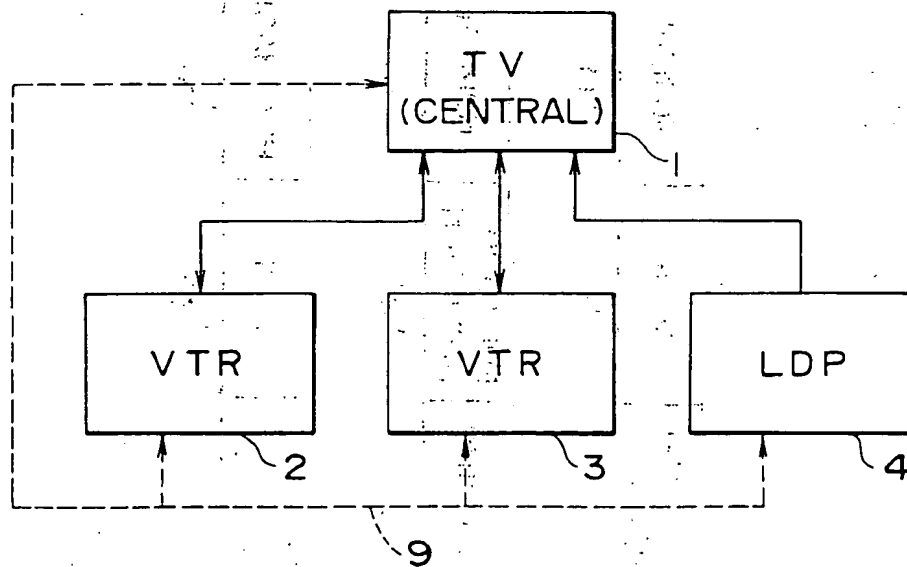


FIG. 4



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